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THE NEW CZECHOSLOVAK MEDICAL TECHNICAL EQUIPMENT  
AT THE INTERNATIONAL FAIR IN BRNO

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AT THE INTERNATIONAL FAIR IN BRNO

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People's "Chirana" Enterprise, Prague

The international fair at Brno (Czechoslovakia) lasted from 6 to 20 September 1959. In a brief review we present the new developments in medical technology, represented at this fair.

The goal of the exhibition of articles of Czechoslovak public health technology was to provide a graphic review of the newest types of apparatus, mechanisms, instruments, and equipment which are necessary in current medical practice.

Two very new types of current radiological apparatus exhibited at the fair utilize radioactive cobalt and cesium as sources of irradiation: the "khizotron" and the "tsezioteraks" /cesiotherax/.

The khizotron (Figures 1 and 2), operating with  $\text{Co}^{60}$ , in combination with a special irradiation table, consists of a universal irradiator for the deep therapy of tumors. Its source has an irradiation activity of 1,000 r per hour (at a distance of one meter).

The tsezioteraks (Fig. 3) is an irradiator for medium-deep therapy, operating with  $\text{Cs}^{137}$ . The intensity of the tsezioteraks (60 r per hour) corresponds to the use of the apparatus in therapeutic practice for the irradiation of tumors, which have formed under the surface of the skin. The control is analogous to the control of the khizotron.

Both pieces of apparatus have been constructed in such a way that the dose on the surface of the irradiator was below the dose which is permissible according to the international norms.

The group of X-ray apparatus for deep therapy of tumors includes the khiranaks-B apparatus, which permits can-

cerous and other malignant tumors to be treated effectively. Its working voltage amounts to 340 kv in the presence of an anode current of 16 ma.

New developments in Czechoslovak X-ray technology were represented by the stabiliks hexakenotron diagnostic apparatus produced by Khiran. It is so constructed that it makes possible rapid and highly accurate work during roentgenography and provides simultaneous lowering of the irradiation dose. The apparatus works at a maximum voltage of 150 kv and an anode current of 1,000 ma.

The "Unitom" universal diagnostic installation (Fig. 4) permits one to conduct X-ray photographs in section in all positions and projections, which was impossible up to this time with the aid of normal tomographs.

The "durometa" is a diagnostic tetrakenotron X-ray apparatus with thorium kenotrons. Its maximal power is 125 kv at 300 ma.

The "motoskop-312" is an X-ray installation with a motor drive for examination with the aid of X-rays. It makes it possible to incline the patient in any position -- from the vertical position to the Trendelenburg position. The installation is equipped with an automatic seriograph, folding and unilaterally attached, with ceiling balancing.

The "vertigraph" is an X-ray tripod, serving to produce distance photographs of the standing patient. It is equipped with a Bucky diaphragm, which can be inclined horizontally, to permit roentgenography of seated patients and photographs of the skull.

The construction of the "Bucky table," type 630, is distinguished by a packing slab suspended at one side support and a cart for the receipt of normal photographs or a cart for normal and enlarged photographs.

The "seriometa" apparatus (Figure 5) serves for the effective diagnosis of tuberculosis, silicosis of the lungs, etc., and is intended for fluorography, chiefly for serial photographs of the lungs.

The "peketriks" is a diagnostic tetrakenotron X-ray apparatus, supplemented with angiographic equipment for simultaneous photographs in two planes, with two Odel'ka chambers with a Rapidiks X-ray cassette. It serves for the diagnosis of cardiovascular diseases.

The "unidur-115" consists of an X-ray diagnostic apparatus with a half-wave circuit for skiascopy and skiagraphy. Its maximal power amounts to 115 kv at 200 ma.

The "motoskop-145" is an inclined X-ray panel with a manual seriograph, ceiling balancing, and a universal support of the X-ray tube.

A new type of "stomaks" X-ray apparatus has been

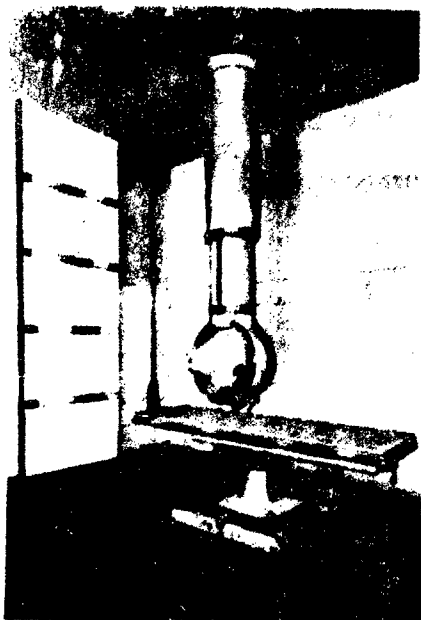


Fig. 1. General view of the khizotron -- apparatus for gamma therapy.

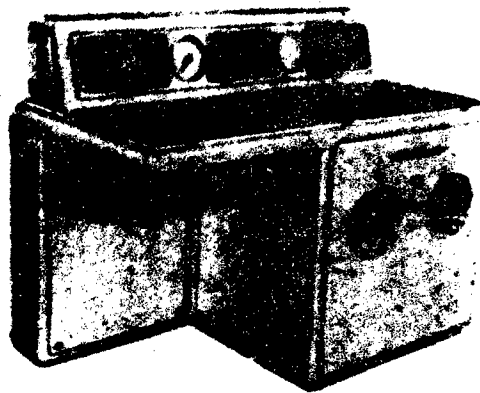


Fig. 2. Control panel of the khizotron.



Fig. 3. Head of the tsezioteraks apparatus with Cs-137.



Fig. 4. Unitom tomograph.

released for ambulatory and dental clinical practice with a voltage of 70 kv at a current of 15 ma.

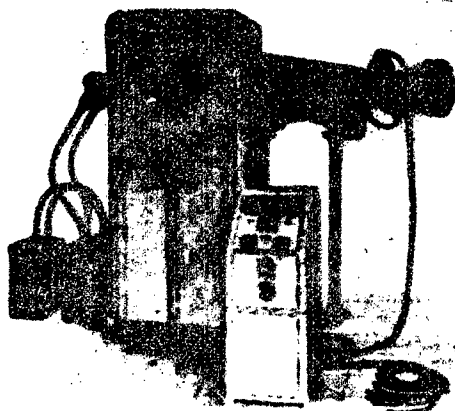


Fig. 5. Seriometa fluorograph

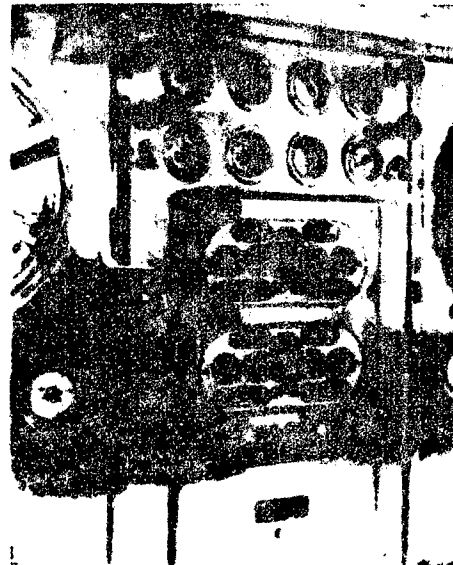


Fig. 6. Control panel of the automatic sterilization installation.

The "minident" is a dental X-ray apparatus with a voltage of 55 kv at 12 ma; one of the small sized, but powerful pieces of apparatus.

Of the new developments in X-ray tubes, the protected X-ray tubes with rotating anode at a voltage of 100, 125, 150 kv and special tubes at a voltage of 115 kv with variable current, designed for the unidur-115 apparatus, are attracting attention.

Of the sterilization apparatus, the most interesting is the SOU-5 automatized sterilization installation, aggregates of which are controlled automatically from a central panel (Fig. 6). A registering thermometer is constructed in the apparatus for the control of the sterilization process. The vapor pressure is 2.5 atm, the maximal vapor consumption is 80 kg/hour, the maximal water consumption is 1,200 liters/hour, the input power of electrical energy is 4.5 kw.

The "AUT-27 cabinet autoclave with pneumatic seal," intended for exploitation at blood transfusion stations, etc., is no less interesting. The central seal is controlled by compressed air, which eliminates

laborious operations. In case of an accident, the door of the pneumatic system can be closed manually.

The "AUT-21/1 desk autoclave" with an electrical heater sterilizes by the action of steam at  $145^{\circ}$ . The apparatus is equipped with an automatic pressure regulator, a timer with regulation of exposure up to one hour and with a central seal.

The "neosteril" electric sterilizer operates on hot air. The temperature is regulated automatically in the 60 to  $200^{\circ}$  range.

The oil "STE-36/1 dental sterilizer" serves to sterilize straight and angle drill tips. The tips are sterilized in oil at a temperature of around  $160^{\circ}$ , after which the excess oil is removed from the tips in a centrifuge, mounted in the apparatus. Twenty-four tips can be sterilized simultaneously.

The "PRI-39/1 universal distillation apparatus with a productivity of from 40 to 60 liters/hour in the presence of steam heating or of 15 liters/hour in the presence of electrical heating is used for obtaining distilled and apyrogenic water. The apparatus is exhausted with steam heating at a vapor pressure of 2.5 atm or with electrical heating at 12 kw. One can also join an attachment to it for heating with gas.

The temperature, the air circulation, and the humidity are automatically regulated by means of the "TER-3 thermostat".

The "LS-110 dryer" with automatic regulation of the temperature and forced circulation of the air was also exhibited in the group of sterilization apparatus.

"Khirop," a universal operation table, used in conjunction with supplementary equipment for all kinds of operations, serves for equipping operation rooms. The table is raised hydraulically, with the aid of an electromotor or a pedal lever. Control of the position of the table and the panels is effectuated from one place.

The universal "khireks" apparatus includes a number of independent elements, including an electrotrepine with a regulated number of revolutions, an apparatus for endoscopy and cauterization, an apparatus for coagulation and an electric suction pump. At the world exposition in Brussels in 1958, the apparatus was awarded a silver medal.

The "N-5 anesthesia apparatus" is for narcosis with a closed system, and it makes it possible to use small and large cylinders for the gases  $O_2$ ,  $CO_2$ ,  $N_2O$ ,  $C_3H_6$ . It is equipped with a suction apparatus, a tonometer, and also a vaporizer for ether and narcogen.

The "DK portable anesthesiograph apparatus" is used for

inhalation narcosis in a semi-open system by the action of ethereal and narcogenic vapors in a mixture with air or oxygen. Narcogen can be replaced by other volatile anesthetics.

The universal stomatological installation Khirana-518 "Khiromat" (Fig. 7) with an air turbine represents one of the most modern pieces of dental equipment. The number of revolutions of the turbine amounts to around 300,000 per minute, and the drill is cooled automatically.

The air turbine, together with the high-speed drill machine whose number of revolutions per minute extends from 12,000 to 30,000, can supplement the more simply constructed Khirana-515 "Unimat" stomatological installation.

Electromedical apparatus is represented by the single-channel electrocardiograph, the "elkagraf." This portable apparatus, housed in a box, is outlet-powered with direct transcription on heat-sensitive paper. The displacement of the paper proceeds with two speeds, and the transcription is produced in rectangular coordinates.

The "khirokard" (Fig. 8) is a new six-channel electrocardiograph with direct transcription which possesses, in addition to automatic control of periodic switching out, seven speeds of paper motion. The apparatus is outlet-powered with direct transcription on heat-sensitive paper in rectangular coordinates. The apparatus is so constructed that one can install two supplementary pieces of apparatus (for example, a phonocardiograph, a tonometer, etc.). In the cardiographs mentioned, the sensitivity, the range of frequencies, and the linearity exceed the requirements of the international standard.

The "Prema" defibrillator is prescribed for terminating ventricular fibrillation, which occurs in the presence of operations in the thoracic cavity, in the presence of anesthesia, hypothermia, after certain cases of trauma, etc. It permits one to conduct defibrillation, both in the presence of an opened, and also in the presence of a closed thoracic cage.

The apparatus was awarded the Grand prize at the world exposition in Brussels in 1958.

The "Pika" clinical incubator is a completely automatized apparatus for saving the life of premature newborn infants. The temperature within the incubator is automatically regulated. The humidity of the air and the concentration of oxygen are established according to the indications of the physician.

Among the laboratory apparatus, the electro-capacitative plethysmograph merits attention. This is an apparatus

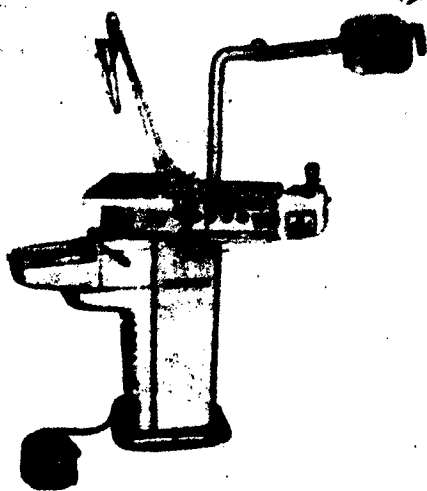


Fig. 7. Khirana-518  
"Khiromat" universal  
stomatological installa-  
tion with an air turbine.

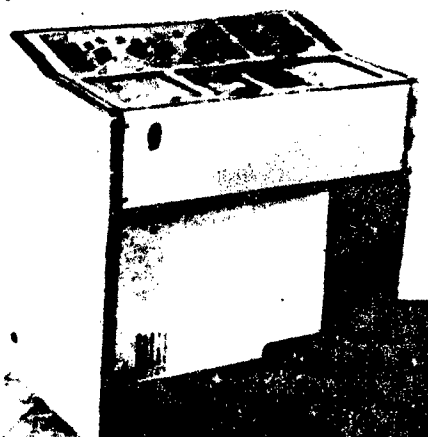


Fig. 8. Six-channel  
electrocardiograph with  
direct transcription --  
the khrokard.

us for determining the change of the volume of human organs, evoked by a greater or lesser filling of the blood vessels. At the world exposition in Brussels in 1958 this apparatus was awarded the Grand prize.

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